

REMARKS/ARGUMENTS

Claims 1-20 as originally filed are pending in the application.

CLAIM REJECTIONS

35 USC § 103(a)

Claims 1-20

The Examiner has rejected claims 1-20 under 35 USC § 103(a) as being unpatentable over Wise et al. ("Wise", U.S. Patent No. 5,995,727) in view of Reisch et al. ("Reisch", U.S. Patent No. 5,168,375). Applicant respectfully traverses this rejection.

With regard to the present application, independent Claim 1 recites:

a method for upscaling a decompressed image comprising: multiplying frequency domain coefficients for the decompressed image by a scale factor to achieve a desired amount of image upscaling; and padding the frequency domain coefficients with sufficient zeros to provide the desired scaling.

The remaining independent Claims 8 and 15 recite similar limitations.

Wise appears to teach a method for image decompression where a "two-dimensional IDCT result is then obtained by performing two one-dimensional IDCT operations in sequence (with an intermediate reordering transposition of data)." (Wise; col. 29, lines 32-35). Wise then teaches that

(i)n a common processing step, for $N = 8$, a first pair of input values is passed without need for multiplication to output adders and subtractors. Each of a second pair of input values is multiplied by each of two constant-coefficient values corresponding to two scaled cosine values. No other multiplications and only one subtraction and one addition are required in the common processing step. The second pair is then added or differenced pairwise with the first pair of input values to form even and odd resultant values. (Wise; col. 29, lines 36-45).

Wise further teaches that the upscaling of cosine values is undertaken because

the single additional multiplication step (upward scaling by the square root of two) of the input data in each 1-D operation leads to the elimination of still other multiplication steps that are required when using conventional methods. (Wise; col. 32, lines 46-50).

Thus, Wise appears to teach that at least some coefficient cosine values are temporarily upscaled in order to reduce the “size and complexity of the semiconductor implementation” (Wise; col. 32, lines 9-10) and, hence, Wise further teaches that:

each of these 1-D operations includes a multiplication by the same square root of two factor. Since the intermediate transposition involves no scaling, the result of two multiplications by the square root of two in series is that the final 2-D results will be scaled by a factor of two. To obtain the unscaled value, the circuitry need then only divide by two. Since the values are all represented digitally, this can be accomplished easily by a simple right shift of the data. (Wise; col. 32, lines 26-34).

In other words, Wise balances the upward scaling by teaching that “the values are preferably and deliberately scaled downward by a factor of two by a simple binary right shift.” (Wise; col. 29, lines 61-63; emphasis added). In sum, therefore, Wise teaches that a “deliberate, balanced, upward scaling eliminates several multiplication steps that are required according to conventional methods.” (Wise; col. 29, lines 63-65). Hence, Wise teaches upscaling of frequency coefficients followed by downscaling of those same coefficients so that no net image scaling occurs. Consequently, Wise fails to teach or suggest image upscaling. Thus, Applicant asserts that Wise fails, at a minimum, to teach or suggest **multiplying frequency domain coefficients for the decompressed image by a scale factor to achieve a desired amount of image upscaling** as recited in claim 1 and as required to support a *prima facie* rejection under 35 USC § 103(a). Reisch also fails to teach or suggest these limitations.

Reisch appears to teach a method for image data interpolation. Specifically, Reisch teaches that interpolation is achieved by “modification of the DCT array by the insertion of additional row(s) and/or column(s), and padding the additional row(s) and/or column(s) with zeros.” (Reisch; Col. 17, lines 18-21). However, Reisch does not teach or suggest that image interpolation is achieved by multiplying frequency domain coefficients for the decompressed image by a scale factor to achieve a desired amount of image up-scaling as would be required to support a *prima facie* obviousness rejection. Thus, Applicant asserts that Reisch plainly does not teach or suggest the elements recited in claim 1. In

particular, Reisch clearly does not teach **padding the frequency domain coefficients with sufficient zeros to provide the desired scaling** as recited in claim 1 and as required to support a *prima facie* rejection under 35 USC § 103(a). Wise also fails to teach or suggest these limitations.

In light of the teachings of the cited references, Applicant asserts that Wise and Reisch, taken alone or in combination, fail to teach or suggest all elements of the claimed invention as required to support a *prima facie* rejection under 35 USC § 103(a).

Moreover, even if the Examiner had correctly characterized the teachings of Wise, which Applicant respectfully asserts the Examiner has not, the combination of Wise and Reisch fails to render the claimed invention unpatentable. In making the rejection the Examiner has accurately noted that Wise fails to teach or suggest padding the frequency domain coefficients with sufficient zeros to provide the desired scaling as claimed. The Examiner then asserts that Reisch corrects this deficiency by teaching that interpolation may be achieved by insertion of additional rows and columns and padding the additional rows and columns with zeros. (Office Action, page 3).

Applicant respectfully draws the Examiner's attention to the basic requirements for a *prima facie* case of obviousness. In particular:

Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge of one of ordinary skill in the art. (MPEP, 2143.01).

To support the rejection the Examiner has argued that

(I)t would have been obvious to one having ordinary skill in art at the time the invention was made to use the teaching of Reisch of padding the frequency domain with sufficient zeros to provide the desired scaling in the system of Wise...because such a process of interpolation provide additional sample point (pixels) without effecting the spectrum of the image for matching the image to the pixel array of a display as stated by Reisch in col. 3, lines 12-17. (Office Action, page 3).

But, as Applicant has discussed above, Wise does not teach or suggest image upscaling or image interpolation. Thus, the Examiner's use of Reisch to provide the requisite motivation is improper for at

least the reason that Reisch's teaching of image interpolation has no relevance to the teachings of Wise of a "deliberate, balanced, upward scaling eliminates several multiplication steps that are required according to conventional methods" (Wise; col. 29, lines 63-65; emphasis added) where "the values are preferably and deliberately scaled downward by a factor of two by a simple binary right shift." (Wise; col. 29, lines 61-63; emphasis added).

Further, even if the motivation to combine as suggested by the Examiner is proper, which Applicant maintains it is not, Applicant respectfully reminds the Examiner that

If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. (MPEP, 2143.01)

And

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims *prima facie* obvious. (MPEP, 2143.01).

Applicant has asserted, as discussed above, that Wise at least fails to teach or suggest multiplying frequency domain coefficients for the decompressed image by a scale factor to achieve a desired amount of image upscaling as claimed. Even assuming, for the sake of argument, that Wise does teach multiplying frequency domain coefficients for the decompressed image by a scale factor to achieve a desired amount of image upscaling, which Applicant believes Wise fails to teach, the combination of Wise with Reisch as asserted would render Wise's teachings unsatisfactory for its intended purpose and/or inoperable. Because Wise teaches upscaling followed by downscaling (see Wise; col. 29, lines 35-65), combining Wise's upscaling with Reisch's zero padding would render Wise's subsequent downscaling and hence Wise's overall teachings unsatisfactory for its intended purpose and/or inoperable. This result would appear to explain why neither Wise nor Reisch teach or suggest the combination asserted by the Examiner.

In conclusion, Applicants assert that independent Claims 1, 8 and 15 and their associated dependant Claims are patentable over Wise in view of Reisch and respectfully request that the Examiner withdraw his rejection of Claims 1-20 under 35 U.S.C. 103(a).

CONCLUSION

In view of the foregoing, it is respectfully asserted that all of the claims pending in this patent application are in condition for allowance.

Should it be determined that an additional fee is due under 37 CFR §§1.16 or 1.17, or any excess fee has been received, please charge that fee or credit the amount of overcharge to deposit account #02-2666.

If the Examiner has any questions, he is invited to contact the undersigned at (503) 264-6473. Reconsideration of this patent application and early allowance of all the claims is respectfully requested.

Respectfully submitted,

A handwritten signature in dark ink, appearing to read 'R. D. Hinchliffe', with a long horizontal line extending to the right.

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